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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/916,390	07/26/2001	Matthew J. Carey	ARC920010091US1	7786

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EXAMINER

RICKMAN, HOLLY C

ART UNIT	PAPER NUMBER
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1773

DATE MAILED: 09/24/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/916,390

Applicant(s)

CAREY ET AL.

Examiner

Holly Rickman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 11-24 is/are rejected.
- 7) ☒ Claim(s) 10, 11, 25 and 26 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

1. Claim 6 is objected to because of the following informalities: the dependency of claim 6 is incorrect ( it depends from itself). For purposes of examination, it has been assumed that claim 6 was intended to depend from claim 5. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 11 recites the limitation "the antiferromagnetic material" in line 1. There is insufficient antecedent basis for this limitation in the claim since claim 1, from which 11 depends, does not recite an antiferromagnetic material. For purposes of examination, it has been assumed that claim 11 was intended to depend from claim 10.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

5. Claims 1-5, 7-9 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Kawato et al. (US 2002/0028356).

Kawato et al. disclose a magnetic recording medium having a substrate, an underlayer formed from ferromagnetic layers having at least one non-magnetic spacer layer separating adjacent magnetic layers and a perpendicular recording layer thereon. The ferromagnetic layers of the underlayer are antiferromagnetically coupled via the spacer layer and the medium also includes a non-magnetic intermediate layer between the uppermost ferromagnetic layer and the perpendicular magnetic layer (p. 4, paragraphs 42 and 44; p. 5, claim 1).

6. Claims 1-9 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Shukh et al. (US 2002/0028357).

Shukh et al. disclose a magnetic recording medium having a substrate, an underlayer formed from soft magnetic layers having at least one non-magnetic spacer layer separating adjacent magnetic layers and a perpendicular recording layer thereon. The soft magnetic layers of the underlayer are antiferromagnetically coupled via the spacer layer and the medium also includes a non-magnetic intermediate layer between the uppermost ferromagnetic layer and the perpendicular magnetic layer (p. 2, paragraph 24 to p. 3, paragraph 29).

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7. Claims 1-5, 7-9, 12-13, 15-20, and 22-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Shimizu et al. (US 2002/0127433).

Shimizu et al. disclose a magnetic recording medium having a substrate, an underlayer formed from soft magnetic layers having at least one non-magnetic spacer layer separating adjacent magnetic layers and a perpendicular recording layer thereon. The soft magnetic layers of the underlayer are antiferromagnetically coupled via the spacer layer and the medium also includes at least one non-magnetic intermediate layer between the uppermost ferromagnetic layer and the perpendicular magnetic layer (see Fig. 3A; p. 1, paragraphs 15-16; p. 3, paragraph 51; p. 4, paragraph 64; p. 5, paragraph 73-74; p. 6, paragraph 80).

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawato et al. (US 2002/0028356) in view of Shukh et al. (US 2002/0028357) or Ohno et al. (US 4842917).

Kawato et al. teach all of the limitations of the claims except for the use of ferromagnetic layers formed from CoFeNi, CoFeB or CoFeCu. Instead the reference teaches the use of CoFe.

Shukh et al. teaches the equivalence of CoFe, CoFeB, and CoFeNi for use in a synthetic antiferromagnetic underlayer (p. 3, paragraph 26).

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Ohno et al. teaches the equivalence of CoFe and CoFeNi in magnetic recording media (col. 17, claim 18).

It would have been obvious to one of ordinary skill in the art at the time of invention to substitute CoFeNi or CoFeB for the CoFe layers taught by Kawato et al. in view of the art recognized equivalence of the materials as taught by Shukh et al. and Ohno et al.

10. Claims 6 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al. (US 2002/0127433) in view of Shukh et al. (US 2002/0028357) or Ohno et al. (US 4842917).

Shimizu et al. teach all of the limitations of the claims except for the use of ferromagnetic layers formed from CoFeNi, CoFeB or CoFeCu. Instead the reference teaches the use of CoFe.

Shukh et al. teaches the equivalence of CoFe, CoFeB, and CoFeNi for use in a synthetic antiferromagnetic underlayer (p. 3, paragraph 26).

Ohno et al. teaches the equivalence of CoFe and CoFeNi in magnetic recording media (col. 17, claim 18).

It would have been obvious to one of ordinary skill in the art at the time of invention to substitute CoFeNi or CoFeB for the CoFe layers taught by Shimizu et al. in view of the art recognized equivalence of the materials as taught by Shukh et al. and Ohno et al.

11. Claims 13, 15-20, and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawato et al. (US 2002/0028356) in view of Shimizu et al. (US 2002/0127433).

Kawato et al. teach all of the limitations of the claims except for the orientation of the magnetization direction of the magnetic underlayer structure.

Shimizu et al. teach a comparable magnetic underlayer structure wherein the magnetizations of the soft magnetic layers of the underlayer are advantageously oriented in the radial direction (p. 6, paragraph 80). The reference teaches that the radial orientation allows for improved magnetic permeability in the travel direction of the magnetic head.

It would have been obvious to one of ordinary skill in the art at the time of invention to orient the magnetic moment of the magnetic underlayers taught by Kawato et al. in the radial direction in order to improve magnetic permeability in the travel direction of the magnetic head as suggested by Shimizu.

12. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over unpatentable over Kawato et al. (US 2002/0028356) in view of Shimizu et al. (US 2002/0127433), as applied to claims 13, 15-20, and 22-24 above, and further in view of Shukh et al. (US 2002/0028357) or Ohno et al. (US 4842917).

The combination of Kawato et al. in view of Shimizu et al. teach all of the limitations of the claims except for the use of ferromagnetic layers formed from CoFeNi, CoFeB or CoFeCu. Instead Kawato et al. teach the use of CoFe.

Shukh et al. teaches the equivalence of CoFe, CoFeB, and CoFeNi for use in a synthetic antiferromagnetic underlayer (p. 3, paragraph 26).

Ohno et al. teaches the equivalence of CoFe and CoFeNi in magnetic recording media (col. 17, claim 18).

It would have been obvious to one of ordinary skill in the art at the time of invention to substitute CoFeNi or CoFeB for the CoFe layers taught by Kawato et al. in view of the art recognized equivalence of the materials as taught by Shukh et al. and Ohno et al.

13. Claims 13 and 15-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shukh et al. (US 2002/0028357) in view of Shimizu et al. (US 2002/0127433).

Shukh et al. teach all of the limitations of the claims except for the orientation of the magnetization direction of the magnetic underlayer structure.

Shimizu et al. teach a comparable magnetic underlayer structure wherein the magnetization of the soft magnetic layers of the underlayer is advantageously oriented in the radial direction (p. 6, paragraph 80). The reference teaches that the radial orientation allows for improved magnetic permeability in the travel direction of the magnetic head.

It would have been obvious to one of ordinary skill in the art at the time of invention to orient the magnetic moment of the magnetic underlayers taught by Shukh et al. in the radial direction in order to improve magnetic permeability in the travel direction of the magnetic head as suggested by Shimizu.

14. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawato et al. (US 2002/0028356) or Shukh et al. (US 2002/0028357), in view of Ruble et al. (US 4964242).

Kawato et al. and Shukh et al. teach all of the limitations of the claims except for the orientation the magnetic moment of the magnetic underlayers in the circumferential direction.



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Ruble et al. teach that it is known in the art that by reducing the radial component of magnetization and increasing the circumferential component in magnetic recording media, better differentiation between adjacent tracks on the magnetic surface can be achieved (col. 1, line 67 to col. 2, line 4).

It would have been obvious to one of ordinary skill in the art at the time of invention to orient the magnetization directions of the magnetic underlayers taught by Kawato et al. and Shukh et al. in the circumferential direction in order to achieve optimal differentiation between adjacent tracks on the medium surface.

***Allowable Subject Matter***

15. Claims 10-11 and 25-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 10-11 and 25-26 are allowable over the closest prior art to Kawato et al. (US 2002/0028356) and Shukh et al. (US 2002/0028357). Both references fail to teach or suggest the use of an antiferromagnetic layer in between the multilayer underlayer structure and the substrate. The prior art fails to teach or suggest a motivation to add such a layer to the recording media taught by Kawato et al. and Shukh et al.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Holly Rickman whose telephone number is (703) 305-2642. The examiner can normally be reached on Monday-Friday 9:30-6:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Thibodeau can be reached on (703) 308-2367. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Holly Rickman  
Primary Examiner  
Art Unit 1773

hcr  
September 21, 2002